BOSTON HARBOR

(DEBRIS STUDY)

MASSACHUSETTS

SURVEY

(REVIEW OF REPORTS)

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JULY 1973

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO
NEDED-R

11 July 1973

SUBJECT: Survey (Review of Reports) on Boston Harbor, Massachusetts - Debris Study

HQDA (DAEN-CWP-E)
WASH DC 20314

AUTHORIZATION

1. This report is submitted in response to a resolution adopted 18 March 1966 by the Committee on Public Works of the United States Senate, which reads as follows:

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on Boston Harbor, Massachusetts, published as House Document 225, Seventy-sixth Congress, 1st Session, and other reports, with a view to determining the advisability of eliminating the sources of drift and debris and other obstructions and injurious deposits that pollute the water of Boston Harbor, by removal and disposal of dilapidated structures and derelicts, and by other appropriate measures, along the shores of the harbor, and its tributary waters, that constitute possible obstacles or hazards, or produce damages to existing navigation."

PURPOSE AND EXTENT OF STUDY

2. The purpose of the study is to determine the engineering feasibility and economic justification for Federal participation in a one-time cleanup program to rid the area of its sources of floatable debris, such as dilapidated shorefront structures, derelict

(wrecked) vessels, loose onshore debris and shorefront dumps. An additional purpose is to determine the adequacy or inadequacy of existing governmental laws to cope with these debris problems.

3. All available pertinent data were used to complete this report. These data included U. S. Geological Survey topographic maps; National Ocean Survey Map No. 246; permit plans and data on certain tidewater structures from the Massachusetts Division of Waterways; U. S. Coast Guard data on derelict vessels; and municipal maps completed by redevelopment, planning, and assessment agencies.

DESCRIPTION

4. Boston Harbor is located on the westerly side of Massachusetts Bay about 50 nautical miles northwest of the tip of Cape Cod. The study area comprises a tidewater area of approximately 47 square miles lying landward of a line from Point Allerton at Hull to the tip of Deer Island, Boston. The study area (see inclosed map) also includes the following waters tributary to the harbor: Weir River, Weymouth Back River, Weymouth Fore River to lower dam, Town River, Neponset River to lower dam, Reserved channel, Fort Point Channel, Charles River to lower dam, Little Mystic River, Mystic River to lower dam, and Chelsea River. In addition, it includes the shorefront tidal area of each island within the harbor.

5. The Port of Boston is the largest seaport in New England, considered both from the standpoint of its waterfront facilities and the magnitude of its waterborne commerce, which in 1971 amounted to over 26 million tons. Boston is the principal distribution point for the commerce of Massachusetts, New Hampshire and Vermont, and it affords a short route between Europe and the interior of the United States and Canada. In this section of the country, the port serves as a gateway for the foreign and coastwise receipt of raw materials and petroleum products for a large industrial area producing machinery, textiles, rubber and leather goods, wood and electronic equipment. Twelve communities abut Boston Harbor. Proceeding clockwise from the south, they are: the towns of Hull, Hingham, Weymouth, and Braintree; the cities of Quincy, Boston, Cambridge, Somerville, Everett, Chelsea, and Revere; and the town of Winthrop.

6. There are numerous existing navigation projects located within the harbor. The Boston Harbor project, adopted in 1825, provides

for a main ship channel 35 and 40 feet deep extending from deep water in Broad Sound and along the main waterfront to the confluence of the Mystic and Chelsea Rivers; a 40-foot deep anchorage in the vicinity of President Roads; 35-foot deep channels in the Mystic, Chelsea, Reserved, and the Weymouth-Fore and Town Rivers; and channels varying in depth from 6 to 18 feet in other tributaries of the harbor such as the Neponset, Weir, Weymouth-Back, and Malden Rivers and in Hingham and Winthrop Harbors.

7. There is also an existing Corps of Engineers program for the removal of floating debris from the waters of the Port of Boston to reduce hazards to navigation. This program is a very small one administered under contract with a commercial firm using operations and maintenance funds. Unlike the Port of New York, where specific Congressional authority exists for removing floating debris, the modest program for Boston Harbor does not provide a satisfactory solution to the total debris problem but it does serve to reduce the hazard to small boats. Harbor patrols of 4 hours duration are made regularly three times a week to pick up floating debris which could be harmful to navigation. Frequent additional patrols are made to pick up specific items of hazardous drift as directed, on a 24-hour basis.

IMPROVEMENTS DESIRED

8. A public meeting was held in Boston on 11 July 1967 to provide all interests the opportunity to express their views and desires. About 60 people, representing local, State, and Federal agencies and numerous private interests attended. In general, the group expressed the following views and desires:

a. Floating debris in the harbor is a serious hazard to general navigation and impedes the normal growth of recreational boating activities in the area.

b. Major debris sources are the many dilapidated waterfront structures and derelict vessels in the harbor. These decaying structures are also an eyesore to the harbor. Their removal will enhance the value of the many shorefront development projects now under construction or in the planning stage.

c. A waterfront cleanup project, aimed at the elimination of all derelict vessels, dilapidated waterfront structures and other

sources of floatable debris, is desired. In addition, the present debris collection program of the Corps should be expanded to assure a complete drift collection program.

PROBLEMS UNDER INVESTIGATION

9. The problems under investigation are primarily: (a) damages to pleasure craft and commercial vessels as a result of collisions with floating debris; (b) suppression of shorefront land values; (c) high costs for maintenance of shorefront areas, such as beaches; and (d) an eyesore, aesthetically. These problems are caused by the continuing deterioration of shorefront structures, the break-up of derelict vessels, shorefront dumps, and illegal dumping of all types of materials along the shorefront and directly into the water.

10. The major source of floatable debris is illegal dumping, constituting 45-50 percent of the total amount of floating debris. The next major source of debris is dilapidated shorefront, i.e., wharves, bulkheads, etc. There are over 500 shorefront structures, excluding structures that do not contain floatable materials, within the Port of Boston. Of these, it is estimated that about 300 are wholly or partly dilapidated. Wrecked vessels estimated at 96, lie within Boston Harbor waters. The fourth source of floating debris is shorefront dumps considered a minor debris source. Shorefront faces of dumps are not fenced and thus, susceptible to wave action.

PLAN FORMULATION

11. In formulating the plan of improvement, consideration was, of course, given to the desires of local interests, i.e. the removal and disposal of debris sources along the shorefront and in the tidal waters of the study area. A general map showing the study area is inclosed. Several cleanup plans were considered to determine the most practical and least costly method for (a) complete removal and disposal of those structures considered wholly dilapidated; (b) removal and disposal of those portions of structures found dilapidated, and partial reconstruction when the conditions and use of the structure economically justified repair; and (c) new construction. The latter phase would not be done as part of the cleanup project, but new structure costs are included to determine whether the estimated project benefits are sufficient to justify all of the planned work.

12. An effective one-time cleanup plan was studied which would provide for: (a) floatable debris - remove, incinerate at sea, and dispose of burnt residue in an approved mainland dump; and (b) non-

floatable debris-remove, take to sea and dump. An extensive on-site examination of all sources of debris was completed in 1971. The sources are waterfront structures, primarily timber pile supported wharves, and bulkheads; derelict (wrecked) timber vessels, loose on-shore floatable debris; and shorefront dumps.

13. The examination revealed that there are over 500 shorefront structures of all types, of which 186 were found wholly dilapidated and 105 with portions dilapidated. These dilapidated structures represent about 3 1/4 million cubic feet of materials that constitute a potential source of floatable debris, and should be removed. The examination also showed that there are 96 wrecked vessels within the waters of the study area. Eighty-four of these vessels are of timber construction and 12 are steel. Loose on-shore debris (floatable) amounts to about 75,000 cubic feet. The total quantity of materials from all sources is estimated at close to 4 million cubic feet. Nearly 2/3 of the total volume lie within the boundaries of the city of Boston. Twenty-seven percent of the remaining 1/3 lie within the boundaries of four communities--Chelsea (10%); Hingham (8%); Everett (6%); and Quincy (3%). The remaining 6% of the sources lie within the other seven communities and the harbor islands.

ESTIMATED FIRST COST AND ANNUAL CHARGES

15. A specific plan of improvement with attendant detailed cost estimates, was not fully developed for the following reasons: (a) the study period was extended as a result of reduced Federal funding, (b) the complex and unresolved problem of how to equitably apportion costs between Federal and non-Federal interests (a matter unprecendented because no project for the removal and disposal of sources of debris has ever been authorized), and (c) maybe the most significent, the Commonwealth of Massachusetts received authority in 1971 to clean up State waterways. Funds to initiate this State program, have been recently made available. Furthermore, State funds, we understand, will largely be concerned with the removal and disposal of sources of debris within the Port of Boston. The ultimate impact of this state program on the Corps of Engineers' considered cleanup improvements, has been and remains unknown.

16. Therefore, only a range of the estimate of cost was developed. This cost range varies from $8 to $10 million, based on prices

prevailing in June 1973. The annual charges attendant to this cost range, based on an interest rate of 5 1/2 percent are 1/2 million dollars to over $600,000.

ESTIMATED BENEFITS

17. For the same reasons this report did not derive detailed cost estimates, as listed above, detailed estimates of benefits were not completed, However, benefits expected to accrue as a result of reduced boat-drift damages have been studied. The primary difficulty attending navigation in the study area is that caused by recreational boats colliding with floating debris. About 75 percent of these collisions occur in the outer harbor where about 73 percent of the 4100 recreational boats are based. Using 1969 as a typical year abut 20,000 cubic feet of drift found lying within the tidal zone caused 410 motor boat-drift collisions, representing a 10 percent boat-drift frequency rate. Evidence collected, in 1969, indicates boat owners paid out of pocket $130,000 to repair boats damaged by drift. At the same time, commercial vessel damages caused by collision with drift totaled over $10,000. Without cleanup by 2030, conservative predictions place the boat-drift frequency rate at least twice its present level and dollar boat damage losses to increase by at least a factor of three. Alarmingly, boat-damage losses by 2030 are expected to top the 1/2 million dollar figure. However, with cleanup and local enforcement to keep area maintained about 90 percent of the predicted losses may be avoided. The largest source of benefits, land enhancement, were not developed. Based on experience with a similar debris study recently completed for Providence River and Harbor, Rhode Island, however, there is little doubt that the total benefits resulting from reduced boat damages and land enhancement would be more than adequate to justify the expenditures estimated above.

APPORTIONMENT OF COSTS

18. The removal and disposal of debris sources is partly urban renewal and partly water resources development. However, specific cost apportionment has not been established by higher authority. Therefore, two alternatives for cost sharing were considered for this improvement. One involves the water resource approach, the other involves the urban renewal approach. The latter approach, would call for a flat 2/3 Federal - 1/3 non-Federal apportionment of cost, similar to the cost sharing on some of the Housing and Urban Development projects. The first approach

would be based on the percentages of the specific benefits involved, e.g. land enhancement benefits are considered to be a 100% local benefit, while direct damages prevented to recreational craft are a 50-50 benefit, and direct damages prevented to commercial craft are a 100% general or Federal benefit. Since land enhancement benefits far outweigh the other benefits, the cost apportionment according to this approach could mean a very high non-Federal share.

LEGAL STUDY

19. A compilation and review of existing Federal, State, and local governmental laws, and studies were made to determine their adequacy or inadequacy to correct the debris problem for the area. The highlights of these legal findings are as follows:

a. The Corps of Engineers is the primary Federal agency with jurisdiction over debris sources.

b. The Commonwealth of Massachusetts has jurisdiction over and is responsible for the general care and supervision of harbors and tidewaters. In this respect, the State has authority to prosecute for and to cause to be removed all unauthorized obstructions and encroachments therein.

c. Local communities have no significant authority over debris sources.

d. Possible recommendations for corrective legislation:

1. Eliminate a vessel owner's right to abandon. Suggested form of proposed statute should resemble the Canadian Government's "Navigable Waters Protection Act."

2. Enact legislation for Massachusetts waterways whereby the State may repair private wharf property and may remove abandoned wharf structures and expenses incurred shall be recoverable from the owner and a lien placed upon the property.

3. Increase existing fines for the violation of State's dumping statutes, which are unrealistically low by today's standards.

COORDINATION WITH OTHER AGENCIES

20. All Federal, State and local governmental agencies known to have an interest in the Boston Harbor debris study were notified of the public meeting held in 1967 to obtain views and specific desires of local interests. Some of these agencies have been consulted during the study to obtain information and data and the possible effects of a debris source cleanup program on their activities. Extensive coordination has been maintained with representatives of the Massachusetts Department of Public Works during the last several years to assist them in their newly authorized cleanup program for State waterways, particularly Boston Harbor.

DISCUSSION

21. As previously stated, work on this study was slowed for various reasons. In addition to those reasons already cited, results of the review on the debris study report for New York Harbor by authorities in Washington, D. C., were being awaited. In February 1973, it was learned that the Office of Management and Budget made an unfavorable ruling on the New York Harbor report. OMB determined, after its review of the report, that the plan should provide for debris removal without a subsidy by the Federal government.

22. A great deal more information has been obtained and developed during the study than is indicated by this letter report. While no completed drafts of appendices have been developed, much data is available concerning plan formulation, estimates of first costs and annual charges, methods of removal and disposal, and time required to do the work. A draft appendix is available concerning the legal aspects. Substantial data are available concerning benefits resulting from reduced collisions between recreational craft and floating debris. Some information is on-hand concerning land enhancement. In addition, very useful data sheets and maps developed during and after the extensive field survey, provide valuable information on dilapidated shorefront structures, wrecked vessels, and other waterfront features. All of these data are on hand for perusal and discussion with project engineers at the New England Division.

CONCLUSIONS AND RECOMMENDATIONS

23. As a result of the OMB decision, the Chief of Engineers has directed Corps of Engineer's field offices conducting debris studies to terminate work and submit brief letter reports thereon. Therefore, the Division Engineer, New England Division recommends no further study on the need and justification for removing and disposing of sources of floatable debris in Boston Harbor, Massachusetts be undertaken at this time.

JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer

1 Incl.
Map

CORPS OF ENGINEERS

U. S. ARMY

EVERETT

CHELSEA

REVERE

LIMIT OF STUDY

LIMIT OF STUDY

SOMERVILLE

CAMBRIDGE

CHARLESTOWN

EAST BOSTON

WINTHROP

E740,000

E750,000

E760,000

E770,000

N500,000

N490,000

N480,000

N470,000

N460,000

N450,000

MASSACHUSETTS BAY

DEER I.

LIMIT OF STUDY

OUTER BREWSTER I.

CALF I.

MIDDLE BREWSTER I.

GREAT BREWSTER I.

LOVELL I.

GALLUPS I.

GEORGES I.

RAINSFORD I.

SOUTH BOSTON

PRESIDENT ROADS

DORCHESTER BAY

SPECTACLE I.

LONG I.

THOMPSON I.

BOSTON

DORCHESTER

HULL

PEDDOCKS I.

HULL BAY

HULL

QUINCY BAY

HINGHAM BAY

BUMKIN I.

GRAPE I.

LIMIT OF STUDY

WEYMOUTH FORE R.

WEYMOUTH BACK R.

NEIP R.

HINGHAM HBR.

QUINCY

HINGHAM

LIMIT OF STUDY

WEYMOUTH

CANADA

MAINE

AUGUSTA

BANGOR

NEW HAMPSHIRE

PORTLAND

CONCORD

PORTSMOUTH

ATLANTIC OCEAN

VT.

BOSTON

BOSTON HARBOR

MASSACHUSETTS

HARTFORD

CONN

PROV.

R.I.

LOCATION MAP

SCALE IN MILES

50 0 50 100

LEGEND

- LIMIT OF STUDY
- LIMIT OF CITY AND TOWN BOUNDARIES
- LIMIT OF FEDERAL NAVIGATION ANCHORAGES AND CHANNELS
- MEAN HIGH WATER CONTOUR

NOTE:

TWENTY ADDITIONAL MAPS SHOWING LOCATION AND IDENTIFICATION OF EACH DEBRIS SOURCE ARE ON FILE IN NEW ENGLAND DIVISION OFFICE.

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

BOSTON HARBOR, MASS.
DEBRIS STUDY
GENERAL MAP

SCALE IN FEET

0 2000 4000

NOV. 1968

TO ACCOMPANY SURVEY REPORT DATED: 11 JULY 1973

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PLATE 1